

AMENDMENTS TO THE CLAIMS

The listing of claims will replace all prior versions, and listings, of claims in the application.

Cancel claims 1-19 and add new claims 20-39 as follows:

Listing of Claims:

20. (New) A rocket engine comprising:

a combustion chamber defined by a wall portion and having a chamber axis, a closed end and a nozzle end, said wall portion including a closed end wall, a nozzle end wall and a side wall between said closed end wall and said nozzle end wall, said side wall having an inner side wall surface;

an outlet nozzle at said nozzle end;

at least one first fluid inlet opening in said wall portion for directing a first combustion component fluid into said chamber to create an outer spiral flow of said first combustion component fluid from said at least one first fluid opening along said inner side wall surface toward said closed end, then inwardly toward said chamber axis and then along said chamber axis in an inner spiral flow toward said nozzle end;

at least one second fluid inlet opening in said side wall or said closed end wall for introducing said second combustion component fluid into said chamber at a point downstream from said at least one first fluid opening and at a point prior to said inner spiral flow.

21. (New) The rocket engine of claim 20 wherein all of said second fluid openings are downstream from all of said first fluid openings.

22. (New) The rocket engine of claim 20 wherein at least one of said second fluid openings is in said closed end wall.

23. (New) The rocket engine of claim 22 wherein all of said second fluid openings are in said closed end wall.

24. (New) The rocket engine of claim 20 wherein said one of said first and second combustion component fluids is an oxidizer fluid and the other of said first and second component fluids is a fuel fluid.

25. (New) The rocket engine of claim 24 wherein at least one of said second fluid openings is in said closed end wall.

26. (New) The rocket engine of claim 25 wherein all of said second fluid openings are in said closed end wall.

27. (New) The rocket engine of claim 24 wherein said first and second combustion component fluids are an oxidizer fluid and a fuel fluid, respectively.

28. (New) The rocket engine of claim 27 wherein at least one of said second fluid openings is in said closed end wall.

29. (New) The rocket engine of claim 20 wherein said nozzle end includes a nozzle converging portion.

30. (New) The rocket engine of claim 20 including a cooling skirt surrounding a portion of said nozzle converging portion.

31. (New) The rocket engine of claim 30 wherein said cooling skirt includes a cooling chamber.

32. (New) The rocket engine of claim 31 wherein said cooling chamber is in communication with said first fluid inlet openings.

33. (New) A method of propelling a rocket comprising:

providing a rocket engine having a closed end, a nozzle end and a combustion chamber defined by a wall portion, said wall portion at least including a side wall portion and a closed end wall portion;

introducing a first combustion component fluid through one or more first fluid inlet openings in said wall portion, said first combustion component fluid being introduced to create an outer spiral flow of said first combustion component fluid from said one or more first fluid openings along said inner surface toward said closed end, then inwardly toward the center of said chamber and then outwardly in an inner spiral flow toward said nozzle end;

introducing a second combustion component fluid through one or more second fluid inlet openings in said wall portion at a point downstream from said first fluid inlet openings and at a point prior to said inner spiral flow.

34. (New) The method of claim 33 including introducing said second combustion component fluid near said closed end.

35. (New) The method of claim 34 including introducing said second combustion component fluid at said closed end.

36. (New) The method of claim 33 wherein one of said first and second combustion component fluids is an oxidizer fluid and the other of said first and second combustion component fluids is a fuel fluid.

37. (New) The method of claim 36 wherein said first combustion component fluid is an oxidizer fluid and said second combustion component fluid is a fuel fluid.

38. (New) The method of claim 37 including igniting said oxidizer fluid and said fuel fluid at said closed end.

39. (New) The method of claim 33 wherein said first and second combustion components form a fuel mixture and wherein the method includes igniting said fuel mixture within said combustion chamber.